

ON SOME TROPHOBIOTIC COCCIDÆ FROM BRITISH
GUIANA.^{1 2}

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Representatives of all of the species of Coccidæ discussed in the following pages were collected by Dr. W. M. Wheeler of Bussey Institution, Harvard University, in the course of his investigations at the Tropical Research Station of the New York Zoological Society in British Guiana and were recently submitted to the writer for determination. Critical study of the material available for examination in the National Collection of Coccidæ has shown that two of these species have also been collected in certain of the West Indian islands by the writer and others, and this opportunity has been taken to add these records to those from British Guiana.

SUBFAMILY MARGARODINÆ

GENUS *STIGMACOCCUS* HEMPEL.*Stigmacoccus asper* (Hempel)

A number of specimens of this species were received with the following note by Dr. Wheeler:

"No. 757. Kartabo, B. G. Sept 5, 1920. Taken from a huge colony of *Crematogaster* sp. (near *acuta* Fabr.) nesting under bark of a large standing tree. The nest covered an area of more than 12 square feet and contained several hundred coccids enveloped in black carton. The young coccids were golden yellow, the older darker."

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²—The intimate relations described—as existing between ants on the one hand and the various Homoptera—on the other hand—have a common peculiarity. In all of these cases the ants are supplied with food in the form of an excretion or secretion elaborated from the juices of the plants. Wasmann has therefore designated these relationships as *trophobiosis* to distinguish them from the cases of myrmecophily proper.—(Wheeler, *Ants, etc.* New York, Columbia Univ. Press, 1913, p. 360).

Only preadult specimens and one partially molted adult could be located in the material submitted, and mounts of such specimens have been carefully compared with the corresponding stages from cotype material received by the Bureau of Entomology from Prof. Adolph Hempel, the describer of the species. Some slight differences in the length and stoutness of the heavy spines crowding the derm of the preadult have been observed, but no other morphological characters that even suggest that the specimens from British Guiana represent another species than *S. asper*. In the absence of other stages, as larvae and well developed females and males, in which specific differences might appear, it seems best to regard the specimens from British Guiana as Hempel's species.

SUBFAMILY DACTYLOPIINÆ

GENUS *PSEUDOCOCCUS* WESTWOOD

Pseudococcus bromeliæ (Bouché)

References.—Ferris, Journ. Econ. Ent. vol. 12. no. 4, Aug. 1919, p. 196—Morrison, Phil. Journ. Sci. vol. 17, no. 2, Aug. 1920, p. 173.—Cockerell, Science n.s. vol. 55, no. 1492, 1922, p. 351.

After extended critical study the writer has placed as this species the material from Dr. Wheeler's collections listed below together with his notes on the same.

"No. 116. Kartabo, B. G. July 17, 1920. In the cavities of the stems of a seedling *Cecropia (angulata* I. W. Bailey). The ants belonged to a black species of *Azteca* not yet identified."

"No. 247. Kartabo, B. G. July 23, 1920. The coccids were in the hollow bases of the leaf-petioles of a *Tachigalia paniculata* Aublet with a black species of *Azteca* (*Azteca foveiceps* Wheeler)."

"No. 367. Kartabo, B. G. Aug. 3, 1920. In node-like stem swellings of *Cordia nodosa* Lani. var. *hispidissima* Freser, with the ant *Brachymyrmex* sp. (probably *heeri* Forel)."

No number. "Kartabo, July-Aug. 1920. In the swellings

of the stems of *Cordia nodosa* Lani. var. *hispidissima* Freser, with *Allomerus octoarticulatus* Mayr, the typical ant of this myrmecophyte."

Nos. 209 and 175 have previously been identified in connection with Dr. Wheeler's extended account of the curious social beetles which he found in this region.

An examination of these specimens in comparison with an extensive series of individuals from many other tropical and subtropical areas has indicated that this species is subject to a certain degree of variation in respect to the structural characters that are at present regarded as of taxonomic value, this variation occurring particularly in the number of spines in the different marginal cerarii, the shape of the ventral chitinized area at the caudal apex of the body, and the number of antennal segments.

In the specimens collected by Dr. Wheeler the cerarian spines average slightly more numerous for corresponding cerarii than in typical forms from pineapple, that is, for example, in the same cerarius in ten specimens instead of, say, four having four spines and the other six, three spines each, the proportions may be six with four spines and four with three spines to each. The chitinized ventral thickening in nearly all of the specimens from pineapple is irregularly quadrate, at most only slightly longer than wide, but in the specimens from Dr. Wheeler, while the variation is marked, the average shape of each thickening is distinctly elongate, in this respect more nearly resembling the shape as figured by Ferris (ref. cited) for the species than the usual shape in the specimens from pineapple. The accompanying figure indicates this variation quite clearly. Finally, *P. bromeliæ* normally has 8-segmented antennæ, while in a majority of the specimens sent by Dr. Wheeler these are 7-segmented; however, since these specimens show a range of from six to eight segments there seems no ground for attaching any taxonomic significance to the presence of one less segment in the majority of the antennæ examined.

Prof. Cockerell (ref. cited) has recently called attention to the fact that the identification by modern coccidologists of the mealybug commonly occurring on pineapple as the "Coccus

bromeliæ" of Bouché rests on a very unstable basis due to the ambiguity of the original description. As a matter of fact, it appears to be entirely impossible to determine positively what species was described by Bouché under this name, and our present notion of the species really dates from Signoret's redescription in 1875. As Prof. Cockerell suggests, his "*Dactylopius brevipes*" described from Jamaica on pineapple is identical with the species at present recognized as *P. bromeliæ*, but as *Pseudococcus brevipes* has never attained any standing among coccid workers, while several at present recognize and identify a certain mealybug as *P. bromeliæ*, the writer has preferred to retain the older name regardless of the uncertainty as to what was actually described by Bouché, at least until his species is clearly shown to be something other than the one at present given the name *bromeliæ*.

***Pseudococcus rotundus* sp. nov.**

Occuring in cavities in stems of the host, attended by ants.

Adult Female.—All specimens available preserved in liquid, so nothing regarding normal external appearance can be given; maximum length as mounted 3 mm., maximum width 2.75 mm., specimens in preservative proportionately somewhat more elongate, flattened beneath but strongly convex above; derm clearing completely on treating with potassium hydroxide, except for the appendages and the ventral chitinized areas; antennae normally 8-segmented, not unusual, the range of measurements in microns of segments in four individuals as follows: I, 72-79; II, 68-79; III, 54-64; IV, 36-46; V, 46-54; VI, 43-57; VII, 50-54; VIII, 107-114; legs normal, stout, hind femur and tibia with numerous tiny pores, those on femur frequently clustered, digitules probably normal, but all injured, claw stout, without denticle; beak elongate triangular, with a narrow basal collar and two much larger, distinct segments; with the usual two pairs of dorsal ostioles; normally with 17 pairs of cerarii each composed of spines with accessory setæ and a cluster

of triangular pores, but some of those on the thorax often greatly reduced or entirely wanting; the numbers of spines in the different cerarii showing the following range in four specimens: I (anterior), 3-4; II, 3-4; III, 2-3; IV, 0-3; V, 1-3; VI, 0-2; VII, 1-5; VIII, 0-2; IX, 2-4; X, 2-4; XI, 3-4; XII, 2-4; XIII, 2-4; XIV, 4-5; XV, 4-5; XVI, 6-9; XVII (anal lobe), 11-22; in mounted specimens, with the posterior two or three cerarii on each side dorsal and the remainder ventral; apex of abdomen not produced into lobes; ventral chitinous thickening elongate, bearing several setæ; apical setæ about 145μ long; longest and anal ring seta about 93μ long; anal ring of normal form and construction, with inner and outer rows of pores but with the setæ more numerous than in other species of the genus, there being three larger primary setæ and from five to ten smaller supplementary setæ on each half of the ring, the smaller setæ about half the length of the larger; dorsally with small triangular pores only, these scattered rather uniformly over the surface except along the body margin and at the cerarii where they are more numerous; ventrally with the triangular pores over most of the surface, with a few large, circular, multilocular disk pores around the genital opening, with two median transverse rows of tiny tubular ducts just anterior to these, and with a very few disk pores at the spiracular openings; cerarian spines conical, varying greatly in size; body with numerous, but scattered, slender setæ, these averaging larger dorsally and most abundant along the body margin; with a single, large, quadrate median ventral cicatrix posterior to the hind legs.

Immature Stages.—None available for examination.

This species has been described from five specimens with the following data, according to Dr. Wheeler's notes:

"No. 87. Barakara, B. G. July 15, 1920. In the cavities of the stems of *Cecropia angulata* I. W. Bailey. The ants in this *Cecropia* were a species of *Azteca* not yet identified." (Holotype).

"No. 89. Barakara, B. G. July 15, 1920. In the cavities of

the stems of *Cecropia angulata* I. W. Bailey. The ants belonged to a species of *Azteca* not yet identified." (Paratypes).

No number. "Kartabo, B. G. August 1920. In stems of *Cecropia* with *Azteca* sp. (Paratypes).

The types are in the U. S. National Collection of Coccidæ.

The proliferation of the anal ring setæ in this species is a marked digression from the normal condition in the genus *Pseudococcus* and might be regarded as of sufficient importance to justify the separation of the species from that genus. However, most, if not all, of the other structural characters of the species appear to be characteristic of *Pseudococcus* and it has therefore been placed in that genus.

Genus *Farinococcus*, gen. nov.

A member of the group of which *Pseudococcus* is the typical genus; body oval, antennæ 8-segmented, legs normal, without tiny pores, claw without denticle, beak short triangular, 2-segmented, spiracles stout with large opening and numerous disk pores near mouth, two pairs of dorsal ostioles, cerarii very large, composed of many lanceolate spines, setæ and pores and joined into a continuous band anteriorly; anal lobes not developed, with ventral chitinized thickening and apical seta, anal ring normal, with pores and six setæ, derm with triangular pores dorsally and ventrally and many multilocular disk pores ventrally in genital region, no other pore types, derm with slender setæ dorsally and ventrally, with a single median ventral catrix. *Genotype*.—*Farinococcus multispinosus*, sp. nov.

This genus diverges from the normal Pseudococcine type most conspicuously in the marked development of the cerarii and the great increase in the number of ventral disk pores, and, to some extent, in the enlargement of the spiracles.

Farinococcus multispinosus sp. nov.

Occuring in cavities in the stems of the host, attended by ants.

Adult female.—Preserved in liquid, so nothing regarding the normal external appearance can be given; color of alcoholic

specimens mostly a light yellow brown; body elongate oval, tapering somewhat behind the middle; average length 3.5 mm., width 2.25 mm; uniformly elongate oval when flattened on a slide; clearing completely, except for appendages and ventral chitinized thickenings, on treating with potassium hydroxide; antennæ normally 8-segmented, not unusual, the range of measurements in microns of the different segments as follows: I, 68-78; II, 64-71; III, 46-53; IV, 28; V, 43-57; VI, 43; VII, 46; VIII, 110-118; legs fairly large, stout, the claw without denticle, the digitules normal, those of claw slightly knobbed at tip, all the legs without tiny pores, but all the coxæ with large distinct basal aerolations, and the femora and tibiæ with similar, but quite indistinct, very large aerolations on the upper halves of each; beak short and stout triangular, two segmented; spiracles large and stout, with a number of disk pores near mouth; with two pairs of heavy, thick-lipped dorsal ostioles, cerarii very strongly developed, those on the posterior abdominal segments narrowly but distinctly isolated from each other, those on the anterior portion of the body united to form a narrow continuous submarginal band made up of hundreds of closely crowded lanceolate spines and triangular pores flanked within by dozens of slender setæ aggregated to form more or less distinct groups; posterior cerarii made up of numerous lanceolate spines (apical about 70, preapical about 85, antepenultimate about 80, fourth from last about 70, next about 65, next about 55) and within each of these ventrally a triangular cluster of setæ and in and around both spine and setæ clusters numerous triangular pores; anal lobes not developed, ventral chitinous thickening heavily chitinized, irregular in shape, enclosing three or four setæ; apical setæ set off just outside the ventral thickening, large and stout as compared with the anal ring setæ, perhaps three times the length of these (broken); anal ring placed dorsally well anterior to the body apex, small, of normal structure, with double pore row and six setæ, the derm on each side of the ring protruding and overlapping to form two longitudinal folds covering the ring, except for a linear or oval median slit; derm dorsally with numerous, uniformly distributed,

triangular pores, ventrally with these pores less numerous, but also uniformly distributed, except at and near the body margin, where they are closely crowded, with numerous large circular multilocular disk pores in a heavy collar around the genital opening and in transverse bands on three segments anterior to genital collar, and quinquelocular disk pores of approximately the same size as the genital pores in numbers at the spiracles; no other pore sorts located; dorsally and ventrally with numbers of scattered, slender, faintly lanceolate setæ; with a single large quadrate median ventral cicatrix posterior to the hind legs.

Preadult female.—In general resembling the adult quite closely, differing in the smaller size, the 7-segmented antennæ, the smaller and less developed spiracles, the reduced numbers of spines, setæ and pores in the cerarii and the very great reduction in the number of ventral disk pores.

No other stages have been available for examination.

This species has been described from four mounted and a few unmounted specimens received from Dr. Wheeler with the following note:

“In the cavities of the stems of *Triplaris surinamensis* Chanc. with *Pseudomyrma* sp. nov. (allied to *Ps. triplaridis* Forel.)”

The types are in the U. S. National Collection of Coccidæ.

GENUS *RIPERSIA* SIGNORET

This genus is at present merely a convenient dumping ground for those species of mealybugs having the number of antennal segments reduced and the cerarii usually much reduced in number or even wanting. Until the genera of the true mealybugs are based on an adequate morphological foundation, little else can be done with apparently new species than to place them in some such convenient genus as this one, and it is on this basis that the two species described below have been assigned to a position here.

***Ripersia petiolicola* sp. nov.**

Occuring in the hollow bases of the leaf petioles of the host, attended by ants.

Adult Female.—Preserved in liquid leaving none of the secretory covering available for examination, average length as mounted, 1.3 mm., width 0.875 mm; clearing completely on treating with potassium hydroxide, except for the appendages; antennæ small, placed fairly close together at anterior apex of head, not unusual, normally 6-segmented, but frequently 5 and rarely 4-segmented, the normal measurements in microns ranging as follows: I, 33-39, II, 29-36; III, 36-43; IV, 18-25, V, 18-25; VI, 50-61; legs normal, fairly stout, claw without denticle, hind femur and tibia each with a number of pores; beak triangular, with an incomplete basal collar and two distinct segments; with the usual two pairs of dorsal ostioles; only the two anterior and the two posterior cerarii developed to a definitely recognizable state, the anal pairs with relatively large conical spines, several triangular pores and four to six accessory setæ, the spines in the other recognizable cerarii slender, lanceolate, setalike, the pores less numerous and the accessory setæ fewer or wanting; probably with a more or less complete series of cerarii around the body margin, but these not definitely recognizable, due to the separation of the component parts; anterior cerarii with three spines in each, all others with two; anal lobes slightly indicated, with the apical cerarii underlaid by a faint suggestion of chitinization, with a small, irregular, elongate ventral thickening and an apical seta about 100μ long; largest anal ring seta about 78μ ; anal ring normal with the usual pores and six setæ; body, as far as noted, with only two sorts of derm pores, a few multilocular disk pores around the genital opening and smaller triangular pores scattered rather uniformly over the surface, but more numerous along the margin and in the cerarii; body dorsally with some scattered, slender, lanceolate setæ and ventrally with even fewer, distinctly longer and more slender, hair-like setæ; with a single, indistinct, transverse oval ventral cicatrix posterior to the hind legs.

Immature stages.—None available for examination.

This species has been described from three specimens having the following collection data according to Dr. Wheeler's notes:

"No. 247. Kartabo, B. G. July 23, 1920. The coccids were in the hollow bases of the leaf-petioles of a *Tachigalia paniculata* Aublet with a black species of *Azteca* (*Azteca foveiceps* Wheeler.)"

The types are in the U. S. National Collection of Coccidæ.

***Ripersia subcorticis* sp. nov.**

Occuring under the bark of the host, attended by ants.

Adult Female.—Preserved in fluid, so nothing regarding the normal external appearance can be given; color of alcoholic specimens ranging from yellow brown to dull purple, but usually with a purple tinge; stout oval, flattened beneath, fairly convex above, average length of mounted specimens 2 mm., width 1.5 mm; clearing completely, except for appendages, on treating with potassium hydroxide; antennæ not unusual, normally 7-segmented, but frequently with six, the range of measurements in microns of those available for examination as follows: I, 47-54; II, 39-50; III, 25-35; IV, 22-32; (III and IV where combined, 57-61), V, 22-29; VI, 28-32; VIII, 71-82; legs normal, the claw without denticle, the hind coxa, but not the femur and tibia, with a number of pores; beak elongate triangular, with an obscure basal collar and two distinct segments; with the usual two pairs of dorsal ostioles; cerarii, as such, not distinctly developed, but with loose marginal or ventral submarginal clusters of slender, conical to slightly lanceolate spines, accompanied by a closer grouping of the small triangular pores, these clusters distinctly isolated on the posterior abdominal segments, but forming an almost continuous but inconspicuous band around the anterior margin of the body; anal lobes barely indicated, the apical seta immediately adjacent to the posterior cluster of spines, length not certain, probably about one and a half times that of the anal ring setæ, without any trace of ventral chitinous thickenings; derm dorsally with only the small tri-

angular disk pores, these scattered rather uniformly over the body surface: ventrally with these pores distributed uniformly except at margin close to and in the "cerarii," with some large circular, multilocular disk pores around the genital opening and in narrow transverse rows on the two segments anterior to this, with a very few, tiny tubular ducts near the genital opening and with much larger, short tubular ducts in clusters just within the "cerarii" on the last five or six abdominal segments, these ranging from four to eight in number in the three clusters anterior to the apical but with only one or rarely two in the one or two anterior groups, the apical group median, usually with about twelve pores in it; derm dorsally with fairly uniformly scattered, very slender, lanceolate setæ, ventrally with longer, slender hair-like setæ; anal ring of normal form, with inner and outer rows of pores and with three primary and usually four smaller, secondary setæ on each half, longest anal ring seta about 110μ ; with a single median quadrate ventral cicatrix posterior to the hind legs.

Immature stages.—None available for examination.

This species has been described from four mounted and a few unmounted specimens collected by Dr. Wheeler with the following note:

"No. 79. Barakara, B. G. July 15, 1920. Taken in a large colony of the ant *Tranopelta gilva* Mayr, under the bark of a living tree. The white coccids were present in great numbers over the whole surface of the wood. The ant is usually subterranean, its nest under bark being very exceptional."

The types are in the U. S. National Collection of Coccidæ.

In the multiplication of the anal ring setæ is found a condition exactly comparable to that in *Pseudococcus rotundus*, just described, and it is also similar to the structural modifications of the anal ring in certain other related forms known to be protected and attended by ants, such as *Lachnodiella cecropiæ*, suggesting the possibility that the relationship between the ant and mealybug may have had some influence on the modification in structure.

SUBFAMILY COCCINÆ.

GENUS AKERMES COCKERELL

Following Prof. Newstead's lead, the two species discussed below are continued in the genus *Akermes*, although a comparison of the two with the genotype raises a very serious question as to the correctness of such generic association.

Akermes quinquepori (Newstead)

Reference.—Newstead Bull. Ent. Res. vol. 7, 1917, p. 349.

This species is represented in the material submitted by Dr. Wheeler by three lots of specimens. Dr. Wheeler's notes in regard to these are as follows:

"No. 76. Barakara, B. G. July 15, 1920. Found in a large colony of ants (*Camponotus novogrenadensis* Mayr) which had their nest within that of *Hamitermes excellens* Emerson (MS.) in the bark of a large standing tree. The galleries of the ants interdigitated but did not communicate with those of the termites. The coccids were in the ant galleries and attached in great numbers and in all stages to the surface of the tree itself. It was difficult to remove them without breaking them. A large piece of the inner bark with the coccids was removed with large coccids attached to it. The insects were seen to exude copious drops of clear honeydew from the brown anus on the dorsal surface."

"No. 87. Barakara, B. G. July 15, 1920. In the cavities of a stem of a *Cecropia angulata* I. W. Bailey. The ants in this *Cecropia* were a species of *Azteca* not yet identified."

"No. 164. Kartabo, B. G. July 17, 1920. In the cavities of the stems of a seedling *Cecropia* (name to be supplied later). The ants belonged to a black species of *Azteca* not yet identified."

Through the kindness of Mr. G. E. Bodkin in locating the same, the writer was given the opportunity of collecting specimens of Prof. Newstead's species from the same tree and the same ant nest that produced the individuals described by him

(Collection Nos. A-733 and A-761), and Dr. Wheeler's specimens have been compared directly with these. The specimens from lots No. 76 and No. 164 are entirely comparable with the topotype specimens except for their slightly larger size. The specimens from lot No. 87 average smaller in size and tend more towards a circular shape. The morphological characters, with the exception of some minor differences in the shape and extent of the various chitinized areas, as the collar surrounding the anal plates, appear to be identical within the limits set by a slight allowance for individual variation, in all the specimens examined.

In addition to the British Guiana records, the writer has collected this species in the grounds of the Department of Agriculture, St. Clair, Port-of-Spain, Trinidad, Nov. 23, 1918 beneath the bark of *Ficus (ulmifolia?)* (A-1046), inside the hollowed-out twigs of a large tree of *Pithecolobium saman* (A-1047), and finally on an unknown tree (A-1059), in each case attended by ants.

Some additions to Prof. Newstead's original description may be noted to advantage as aids to the recognition of the species: The claw digitules are present, thread-like, curved, not quite reaching the tip of the claw: the heavy collar at the marginal end of the spiracular complex normally bears two stout, tapering, blunt-tipped, widely separated spines of small size on the outer margin, but these are frequently broken off and the spine base is so placed as to make its recognition very difficult when the spine is missing; the marginal spines are fairly stout, tapering, faintly lanceolate; each anal plate bears from 10 to 15 setæ dorsally, one apical, two subapical, and the remainder scattered over the surface; there are four ventral ridge and four fringe setæ, the latter in two pairs on the edge of the membranous fold beneath the plates; all setæ of the anal plates are slender and of moderate length; anal ring small, with a few large pores and ten setæ; the ventral multilocular disk pores are quite numerous beneath and behind the anal plates and over the posterior portion of the ventral surface, especially near, but not quite at, the body margin, up to the posterior spiracles, but any transverse rows across the middle of the abdominal segments

anterior to the anal plates are very incomplete or wanting; the "submarginal compound pores" are as described by Newstead, but those just in front of the anterior spiracles are perhaps one-third as large as the two anterior to the posterior spiracles; ventrally there are tiny simple pores in addition to the multilocular disk sort; dorsally there are large, circular, faintly multilocular disk pores, much smaller, circular, heavy-walled simple disk pores and, occasionally, from two to five such pores grouped in a solid heavily chitinized plate.

The larva of this species differs from that of the new species described below most obviously in the length of the hairs in the ventral abdominal rows these in the present species being very minute, while in the new species they are much longer and more conspicuous.

***Akermes secretus* sp. nov.**

Reference.—*Coccus* sp., van Zwaluwenburg, Jour. Econ. Ent., vol. 10, 1917, p. 515.

Occuring in cavities in the stems or beneath the bark of the host, attended by ants.

Adult female.—Color in life different shades of light reddish or yellowish brown often varying to a hint of lavender or purple brown; color of alcoholic specimens dorsally very pale grayish brown, with more or less distinct linear transverse mottling of dark brown, tiny blackish flecks along margin, a brown area around anal plates and small white spots at the spiracular openings, ventrally with a marginal band of dull brown, the anterior two-thirds of the surface yellow cream, shading off to brown at edges, the ventral abdominal segments about the same color as the dorsum, the whole venter variously mottled and flecked with dark color; maximum length mounted on slide 5.5 mm., width 4 mm.; convexity apparently varying with the development of the ovaries, never strongly convex, shape irregularly oval, body only lightly chitinized, clearing almost completely on treating with potassium hydroxide, but showing faint *Saissetia*-like areolations in the derm in fully matured

specimens, only the anal plate region and the spiracular areas retaining any marked color; antennæ reduced to short stubs, very indistinctly 4-segmented, bearing a few short slender setæ and several stout blunted setæ at apex; legs also greatly reduced, the different parts not distinguishable, claw present, the claw digitules present, threadlike, curved, extending slightly beyond the apex of the claw; spiracular grooves distinctly deeper than in *quinquepori*, the heavy collar at the inner end perhaps one-third to one-half as wide as in that species and the spiracle itself placed almost immediately below and just inside of the collar rather than at the inner end of a distinct membranous tube as in *quinquepori*; no spiracular spines observed; marginal setæ stout, spinelike, tapering, with swollen bases and acutely pointed tips; beak small and short, apparently 1-segmented; dorsally with an occasional relatively large, circular, apparently very faintly multilocular, disk pore, with much more numerous, smaller circular pores with bilocular centers, scattered uniformly over the surface, and with considerably smaller, simple pores, probably in the aggregate more numerous than the second sort, but tending to cluster into groups of four or more, with wide intervals between clusters; ventrally with multilocular disk pores beneath and around in at least three distinct arches anterior to the anal plates, these normally with eight loculi and somewhat larger than the largest dorsal pore, and with much smaller, apparently simple, circular pores with oval centers, these arranged irregularly in distinctly segmental bands across the middle portion of the abdominal segments, but more numerous and less definitely arranged towards the body margin; no dorsal setæ observed except at body margin and a scattered cluster just inside the opening of each spiracular collar; ventral setæ present, not especially numerous or conspicuous, scattered, except for some indefinite segmental rows anterior to the anal plates, and most abundant on that portion of the ventral surface behind the posterior spiracles; no submarginal tubercles, such as may be found in some genera in this subfamily; the "submarginal compound pores" of *quinquepori* not in evidence; anal plates surrounded by a heavily chitinized

collar, the usual shape of the plates, from above, half ovate, but varying quite a little according to the pressure on the plate; each plate quite deep, with about 15 to 17 scattered setæ dorsally and apically, these frequently broken off, an indeterminate number, apparently three, of ventral ridge setæ, two fringe setæ placed close together at center of fold in membrane, and three to five hypopygial setæ along middle of membrane beneath fringe setæ; anal ring small, oval, with ten small setæ and some large pores.

Larva.—Stout oval, flat, average length 821μ , average width 571μ ; antennæ slender, elongate, 6-segmented, the third very long; legs slender, claw without denticle, digitules slender, those of claw slightly knobbed, those of tarsus hair-like; spiracular spines occurring singly, stout, somewhat tapering; on abdomen, at least, with two dorsal rows of minute pores on each side of the body; ventrally with a submarginal row of relatively long hairs and a similar parallel row some distance in from the margin: anal plates elongate, each with a long apical seta, two small subapical setæ and a subbasal seta; with one pair of fringe setæ.

This species has been described from the following lots of specimens: In branches of *Inga laurina*, Mayaguez, Porto Rico, March, 1915, collected by R. H. Van Zwaluwenburg (holotype and paratypes); on "guama", San-Juan, P. R., Nov. 1912, collected by W. V. Tower (paratypes); beneath bark of *Hematoxylon campechianum* (logwood), Botanic Garden, St. George, Grenada, Nov. 13, 1918 (A-971) and Nov. 19, 1918 (A-1021), Friendship Estate, Tobago Island, Nov. 7, 1918 (A-912), and on the Savanna, Port-of-Spain, Trinidad, Nov. 23, 1918, all collected by Harold Morrison (paratypes), and in the cavities of the stems of *Triplaris surinamensis* Chanc. with *Pseudomyrma* sp. nov. (allied to *Ps. triplaridis* Forel), collected by Dr. W. M. Wheeler at Camaria, British Guiana (paratypes). In all instances where information is available, the species is reported as receiving the attention of some species of ant.

The types are in the U. S. National Collection of Coccidæ.

Aside from the very obvious difference in the presence or absence of the "submarginal compound pores," the two preceding species may be separated very easily by a comparison of a number of other structural characters, as the shape and size of the marginal setæ, the distribution of the ventral disk pores, the character of the dorsal pores in the adult female, and the conspicuous difference in the lengths of the submarginal setæ in the larvæ.

Under the name *Pseudophilippia iniquilina*, Prof. Newstead has described³ from Jamaica a coccid which quite obviously has little or no relationship with the genotype of *Pseudophilippia*, and equally obviously is closely related to the two preceding species. So far as can be ascertained from the figures and the somewhat incomplete description of this species, it stands in an intermediate position between *quinquepori* and *secretus*.

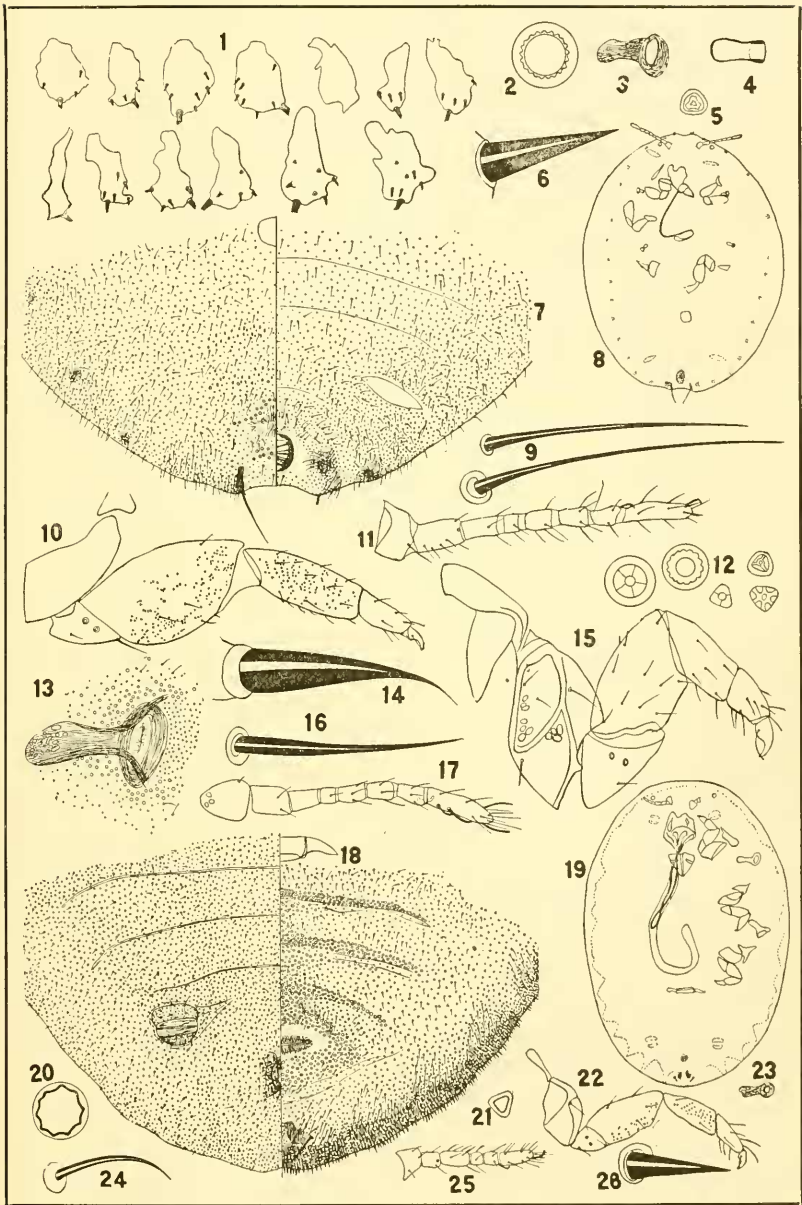
Explanation of Plates.

Plate V.

Fig. 1. *Pseudococcus bromeliæ* (Bouché). Variation in shape of ventral chitinized area of anal lobes, all XI53; top, from left to right, from pineapple, Georgetown, British Guiana (H. Morrison, No. A-703) (2); from Kartabo, B. G. (Wheeler No. 209); from Kartabo, B. G., in leaf petioles of *Tachigalia paniculata* (Wheeler No. 247) (2); from Kartabo, B. G. in stem swellings of *Cordia nodosa* (Wheeler No. 367) (2); bottom, from left to right, first two same as last two of top row: remainder from Kartabo, B. G. in stems of red *Cecropia* (Wheeler No. 116).

Fig. 2-11, *Pseudococcus rotundus*, new species, all adult female. Fig. 2, ventral disk pore, XI000; Fig. 3, spiracle, X80; Fig. 4, tubular duct, XI000; Fig. 5, triangular pore, XI000; Fig. 6, cerarian spine, XI000; Fig. 7, apex of abdomen, X40; Fig. 8, outline from below showing position of parts, XII. 6;

³Bull. Ent. Research, vol. X, 1920, p. 181, fig. 5.



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Fig. 9. dorsal (above) and ventral (below) setæ, XI000; Fig. 10. posterior leg, X80; Fig. 11. antenna, X80.

Fig. 12-19, *Farinococcus multispinosus*, gen. et sp. nov., all adult female. Fig. 12. spiracular, multilocular disk and triangular (three views) body pores, XI000; Fig. 13. anterior spiracle, X80; Fig. 14. cerarian spine, XI000; Fig. 15. posterior leg, X-80; Fig. 16. body seta, XI000; Fig. 17. antenna, X80; Fig. 18. apex of abdomen, X40; Fig. 19. outline of body from below, showing location of parts, extent of spine and seta clusters shown by dotted line at margin, X8;

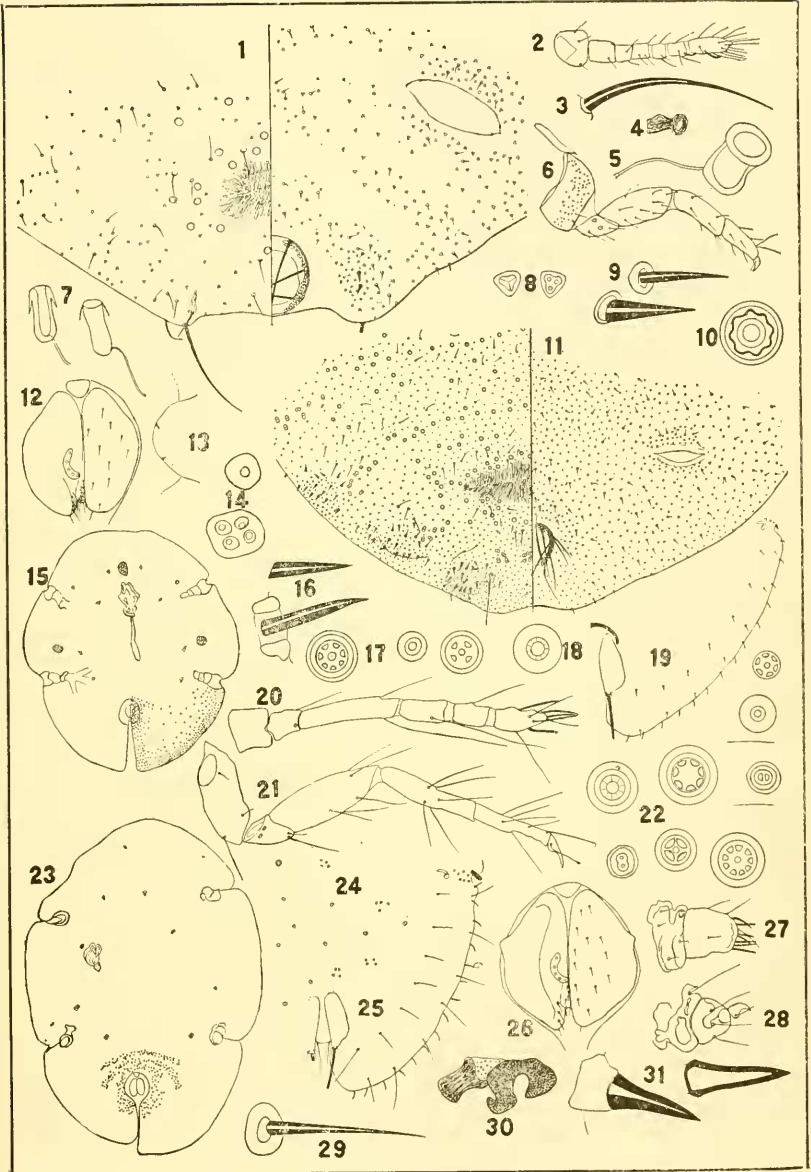
Fig. 20-26, *Ripersia petiolicola*, sp. nov., all adult female. Fig. 20. ventral multilocular disk pore, XI000; Fig. 21. triangular pore, XI000; Fig. 22. posterior leg, X80; Fig. 23. spiracle, X80; Fig. 24. ventral seta, XI000; Fig. 25. antenna X80; Fig. 26. cerarian spine XI000.

Plate VI.

Fig. 1. *Ripersia petiolicola*, sp. nov., adult female, apex of abdomen, XI53.

Fig. 2-11. *Ripersia subcorticis*, new species, all adult female. Fig. 2. antenna, X80; Fig. 3. ventral seta, XI000; Fig. 4. spiracle, X80; Fig. 5. larve ventral tubular duct, XI000; Fig. 6. posterior leg, X80; Fig. 7. small ventral tubular ducts, XI000; Fig. 8. triangular pore, XI000; Fig. 9. dorsal seta (above) and cerarian spine (below), XI000; Fig. 10. ventral multilocular disk pore, XI000; Fig. 11. apex of abdomen, X80.

Fig. 12-19, *Akermes quinquepori* Newst., all adult female except last. Fig. 12. anal plates, X80; Fig. 13. margin of spiracular thickening showing spines, X80; Fig. 14. dorsal simple pores, singly and in cluster, XI000; Fig. 15. outline of body, optical section, showing particularly the five dorsal "cribriform plates" and the arrangement of the ventral disk pores, X8; Fig. 16. marginal spines XI000; Fig. 17. ventral multilocular disk and simple pores, XI000; Fig. 18. Dorsal multilocular disk pore, XI000; Fig. 19. margin of abdomen of larva showing short ventral setæ, X80.



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Fig. 20-31. *Akermes secretus*, sp. nov., all adult female except first two and figure twenty-five. Fig. 20, antenna of larva, XI53; Fig. 21. leg of larva, XI53; Fig. 22. adult female, group of derm pore sorts, XI000; Fig. 23. outline in optical section, showing parts, and arrangement of ventral multilocular disk pores. X8; Fig. 24. section of dorsal derm in abdominal region, showing tendency of small simple pores to group in clusters of four, X40; Fig. 25. larva, margin of abdomen showing long slender ventral setæ, X80; Fig. 26. adult female, anal plates, X80; Fig. 27. antenna, XI53; Fig. 28. legs XI53; Fig. 29. ventral seta, XI000; Fig. 30. spiracle, X40; Fig. 31. marginal spines, XI000.